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The diffusion handbook : applied solutions for engineers

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Abstrak

This compendium of analytical solutions is intended to serve as a handbook or research level course for Petroleum, Chemical, Mechanical, Civil or Electrical engineers and applied scientists. The book, comprising over one thousand solutions, has been written specially for post-graduate students and practitioners in the industry who are searching for ready-made solutions to practical problems.The primary focus of this book is to catalogue solutions to boundary-value problems associated with Dirichlet, Neumann, and Robin boundary conditions. It also offers some variations that are of practical use to the industry. These variations include, subdivided systems where the properties of each continuum are uniform but discontinuous at the interface, solutions involving boundary conditions of the mixed type, where the function is prescribed over part of the boundary and its normal derivative over the remaining part, and problems that involve space and time-dependent boundary conditions. All semi-analytic solutions presented in this book are accompanied by prescriptions for numerical computation.The diffusion coefficient and the initial and boundary conditions used in this book apply to fluid flow in a porous medium. Nonetheless, all solutions can be equally applied to problems in heat conduction and mass transfer.